Cosmos DB

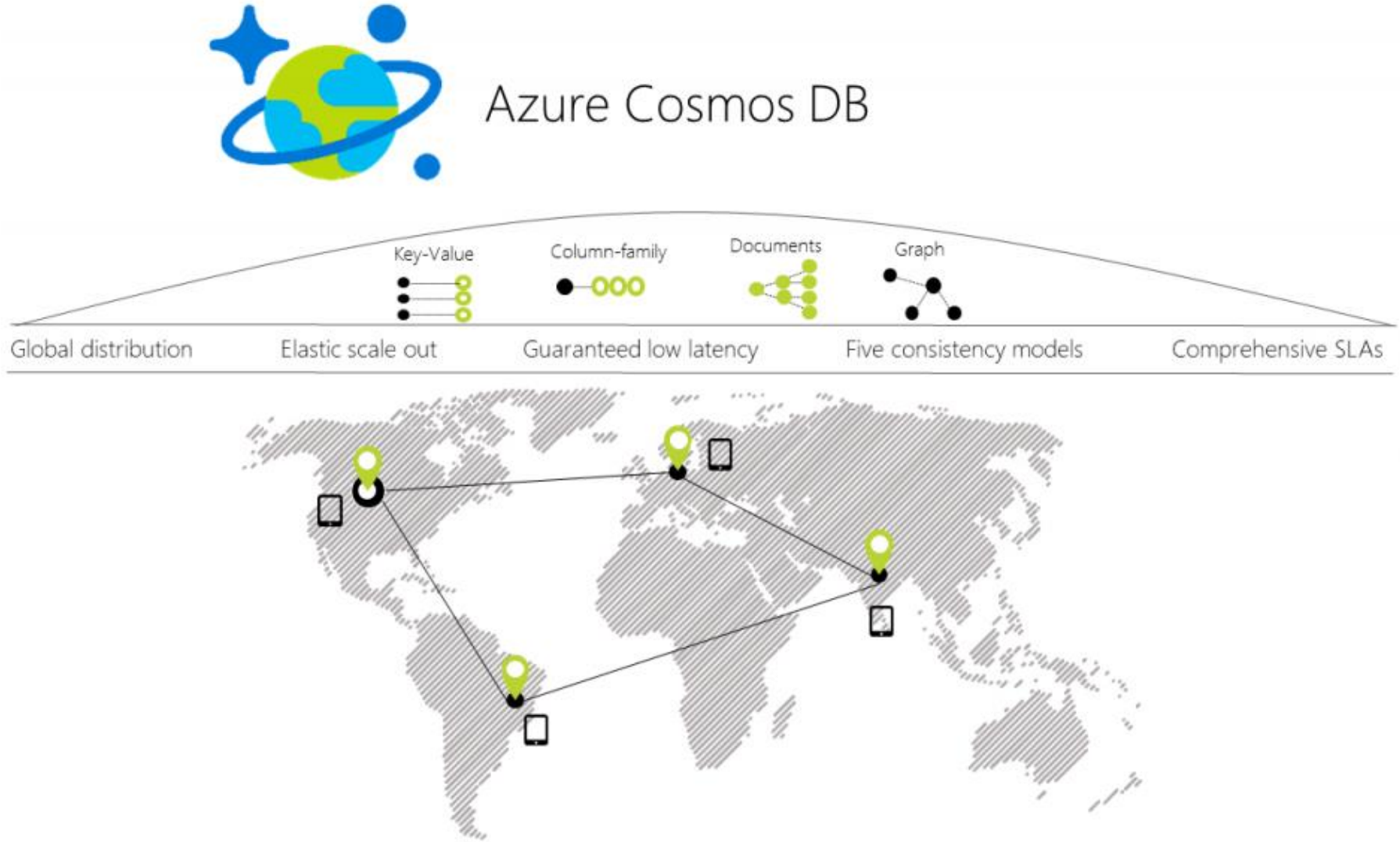
한국마이크로소프트 최준호

Microsoft

The Halo development team considered various NoSQL technologies for their data platform, but ultimately chose Azure Cosmos DB due to the speed and flexibility offered by its automatic indexing capabilities. Cosmos DB allowed the Halo: Spartan Companies' services to support queries without having to setup and maintain schema or secondary indexes.

Cosmos DB 란?

글로벌 데이터 분산을 지원하는 멀티 모델 데이터베이스



Global distribution

Save | Discard | Manual Failover | Automatic Failover

Click on a location to add or remove regions from your Azure Cosmos DB account.

* Each region is billable based on the throughput and storage for the account. Learn more

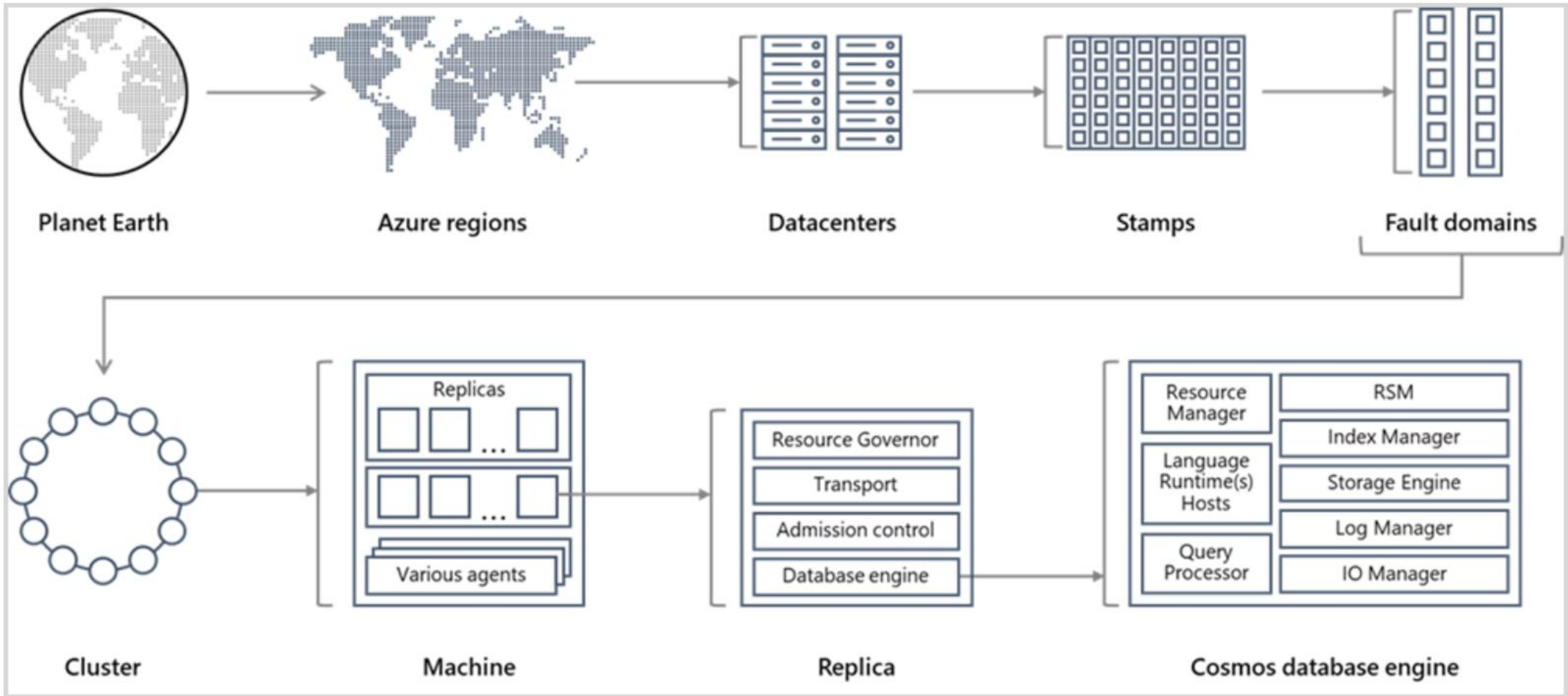
Configure regions

Configure the regions available for reads and writes. + Add region

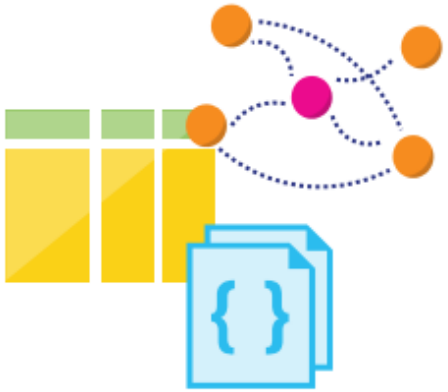
REGIONS	READS ENABLED	WRITES ENABLED	
Korea Central	✓	✓	🗑
East US 2	✓	✓	🗑
UK South	✓	✓	🗑
France Central	✓	✓	🗑
North Europe	✓	✓	🗑
Central India	✓	✓	🗑

복사

ntKey,


Planet Earth
Azure regions
Datacenters
Stamps
Fault domains
Cluster
Replicas
Various agents
Machine
Resource Governor
Transport
Admission control
Database engine
Replica
Resource Manager
RSM
Index Manager
Language Runtime(s) Hosts
Storage Engine
Log Manager
Query Processor
IO Manager
Cosmos database engine

Multi-model + multi API



SQL

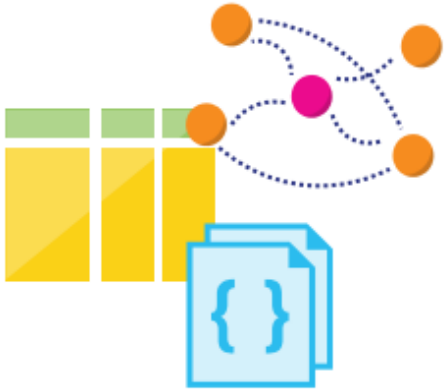
MongoDB

Gremlin

Cassandra

Table

Multi-model + multi API



SQL

JSON DB엔진

SELECT * FROM Families f WHERE f.id='AndersenFamily'

SELECT * FROM Families f WHERE f.LastName = 'Andersen'
ORDER BY f.Address.State DESC

https://www.documentdb.com/sql/demo

Multi-model + multi API

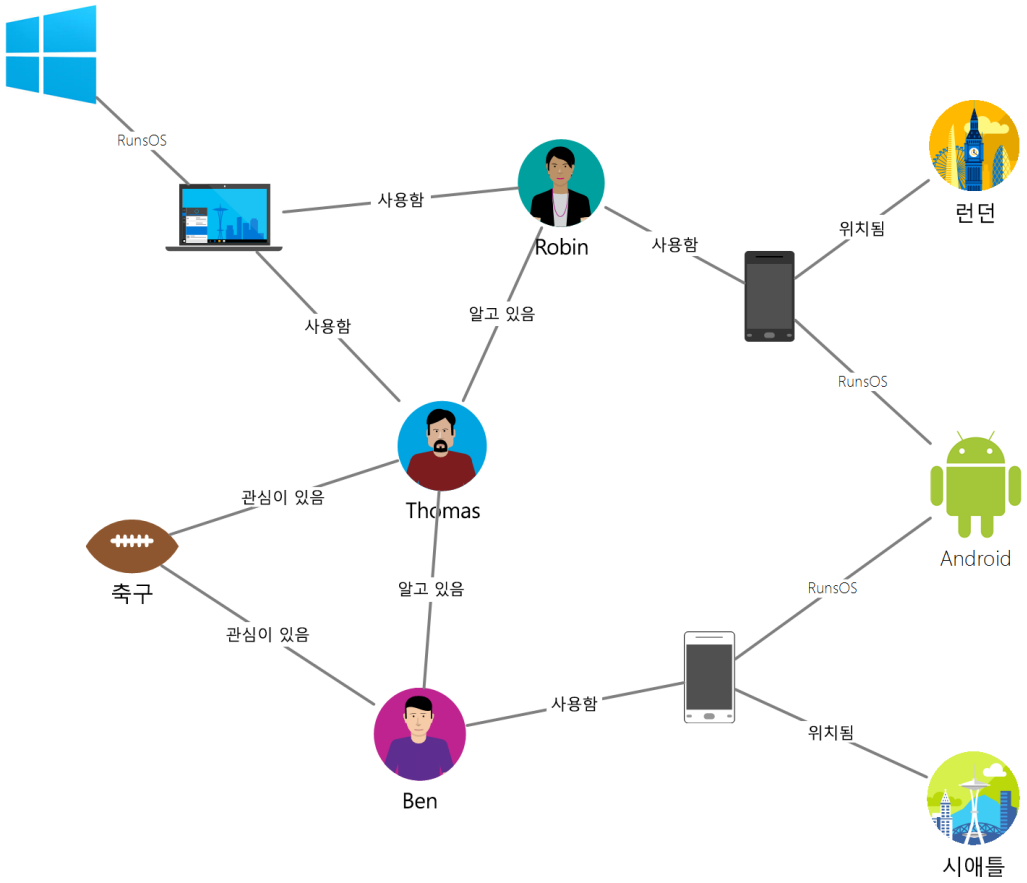
MongoDB

기존 MongoDB 클라이언트 드라이버와 호환

다양한 마이그레이션 방법 제공
- Database Migration Service
- Mongoexport to MongoImport
- Mongodump to Mongorestore

참고: https://datamigration.microsoft.com/scenario/mongo-to-cosmos

Multi-model + multi API



Gremlin

그래프 데이터베이스

친구, 길드, 소셜 네트워킹, 추천 서비스 등 다양한 용도로 활용 가능

Multi-model + multi API

Cassandra

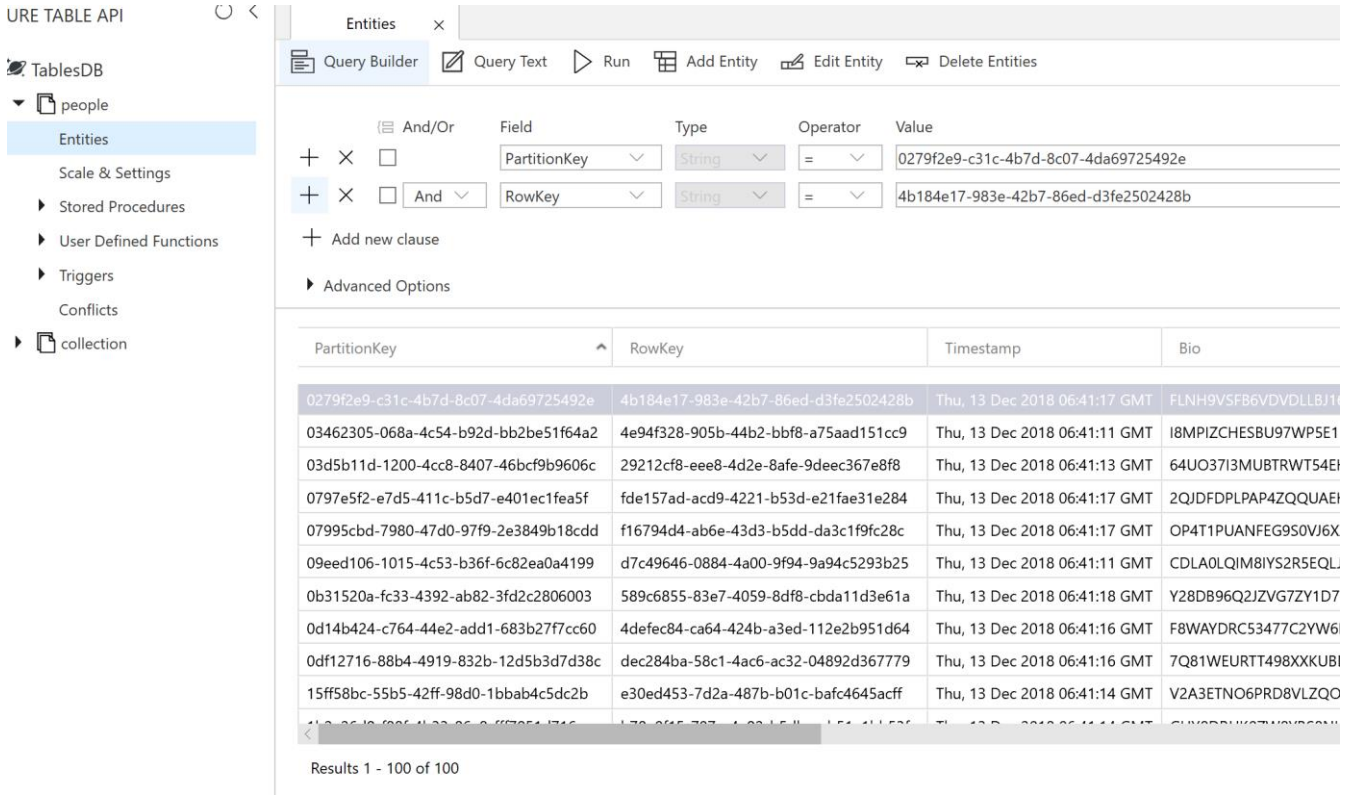
기존 Cassandra 클라이언트 드라이버와 호환

CQL, cqlsh 지원

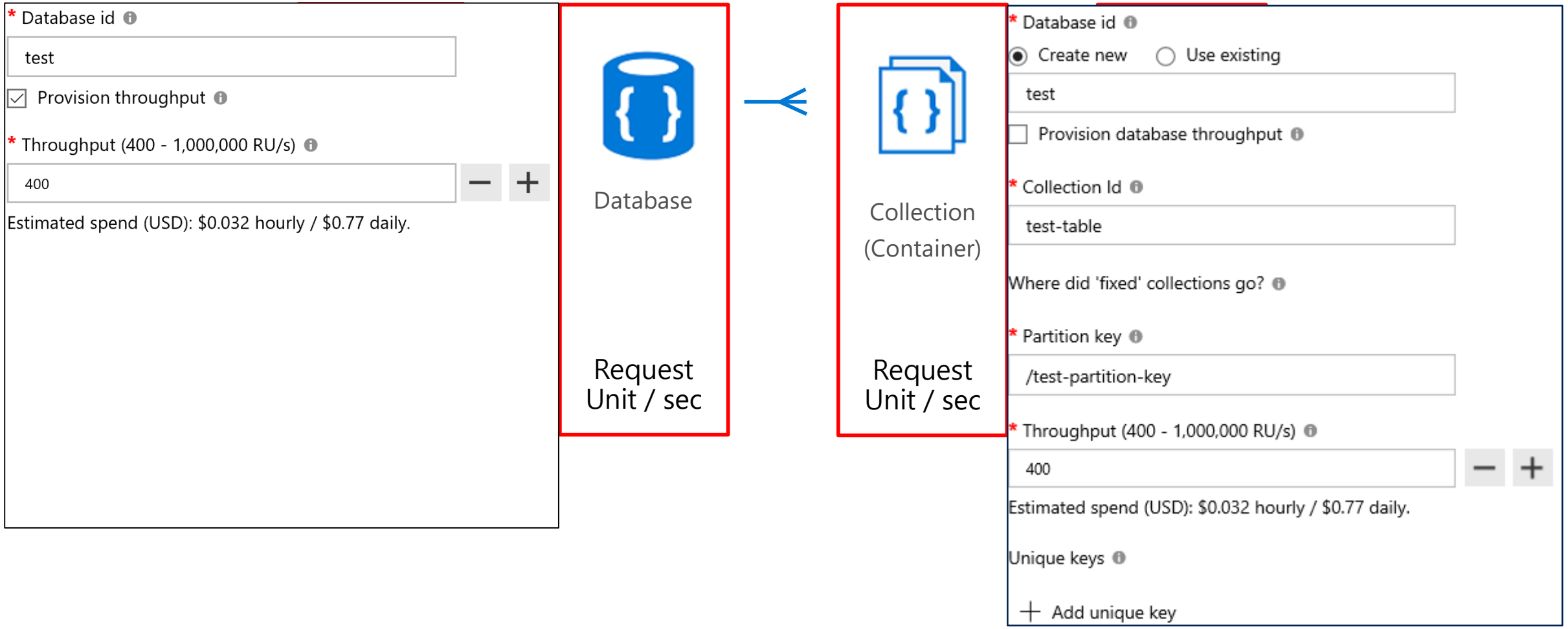
Spark, Databricks, HDInsight와 연결

Multi-model + multi API

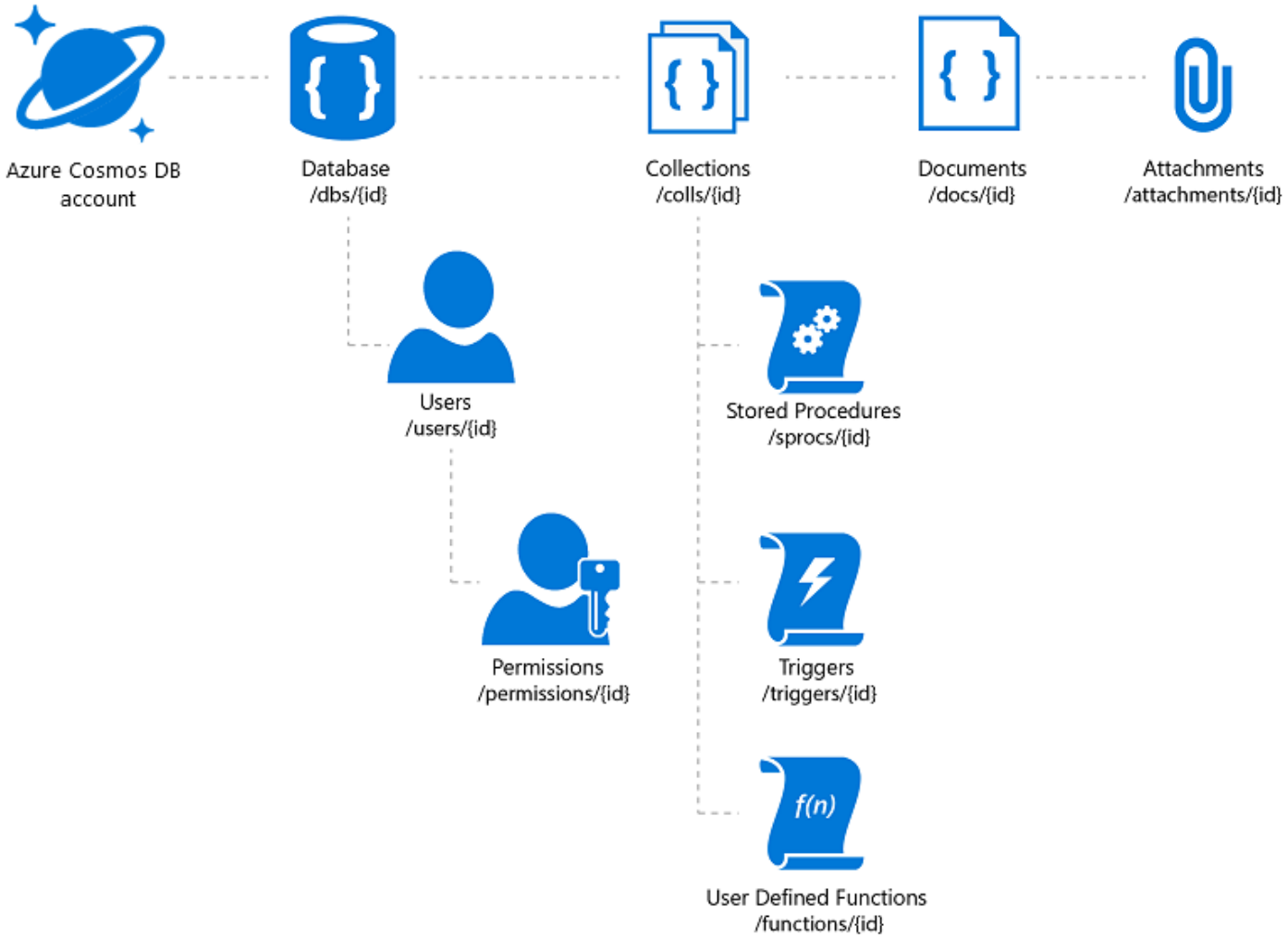
Table



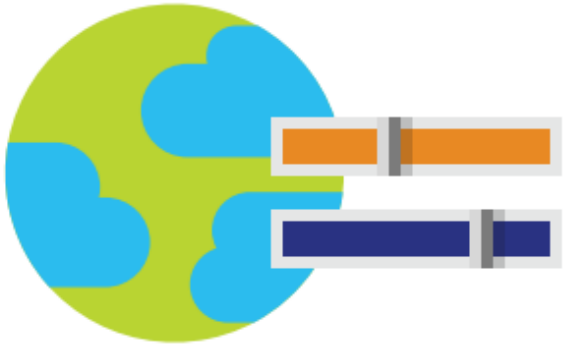
Cosmos DB Resource model



Cosmos DB Resource model

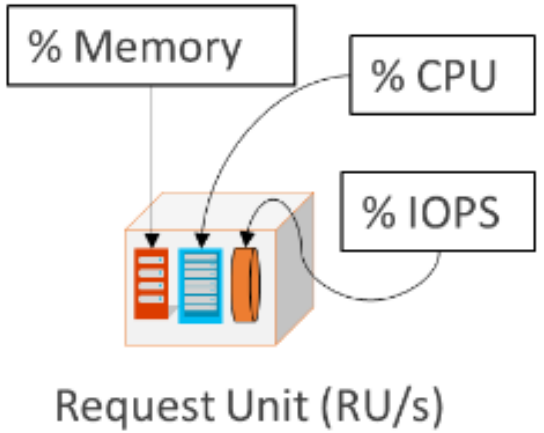


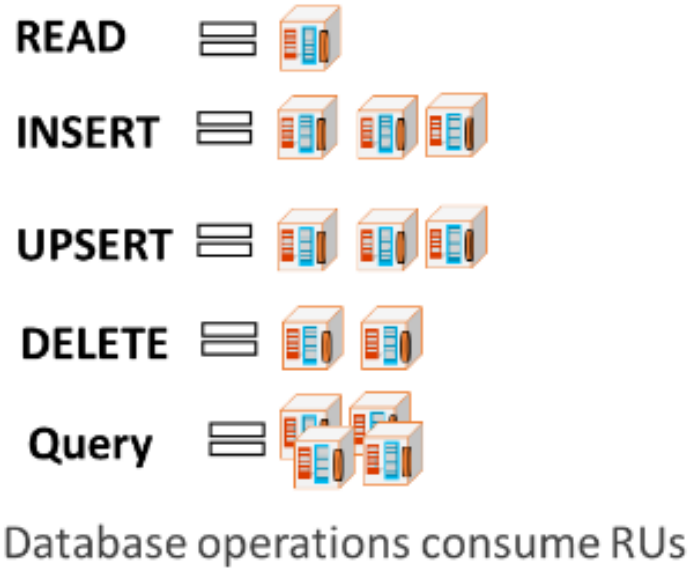
Cosmos DB RU Costs



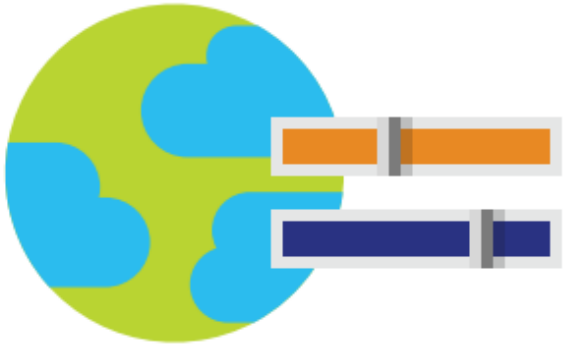
1 RU는 1KB 문서의 Get 처리량

Read 1 RU vs Write 5 RU





Cosmos DB RU Costs

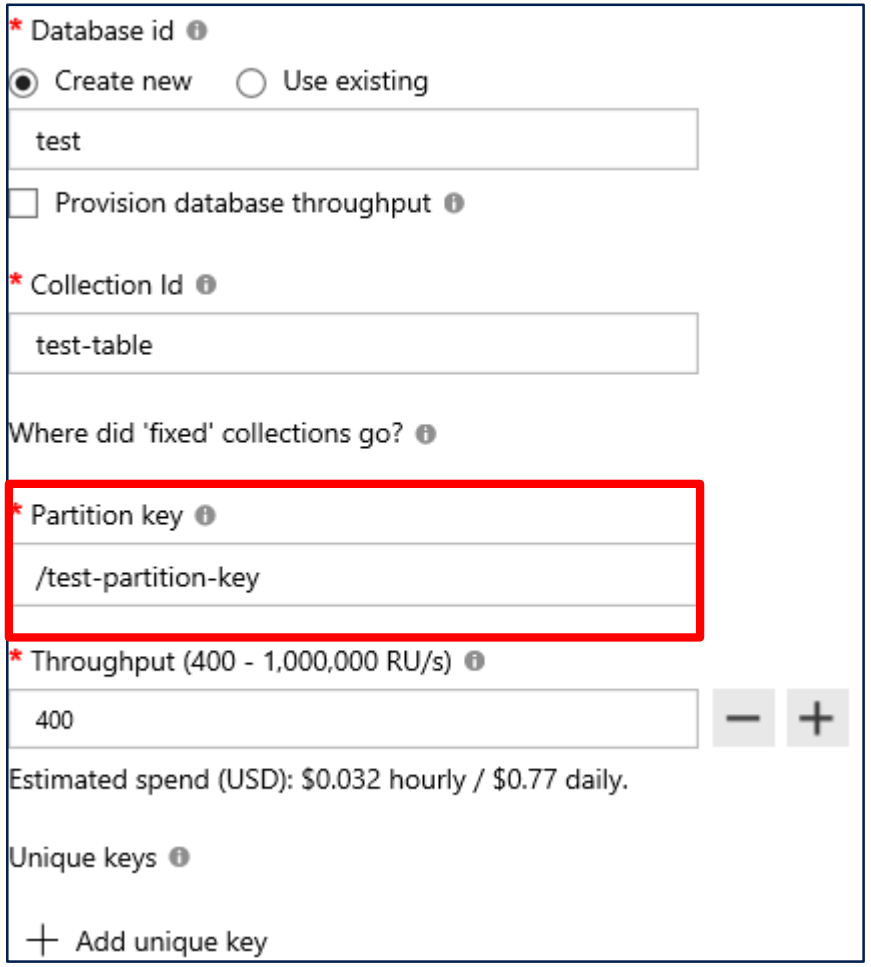


시간당 최고 RU 기준으로 비용 산정

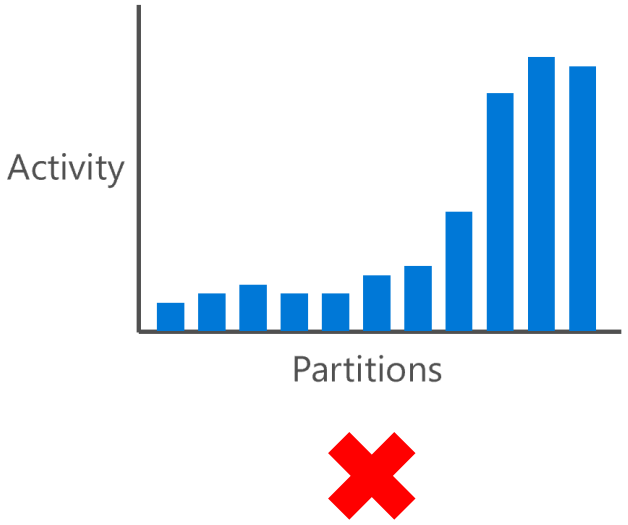
데이터베이스나 컨테이너가 존재하면 비용 산정

예약 용량 사용으로 최대 65% 비용 절감 가능

Partition Key



- 데이터가 골고루 분산될 수 있는 파티션 키 선택이 중요
- 핫 파티션 제거
- 서비스 워크로드 점검
- POC (BMT, Stresstest)



Consistency

Strong (강력)	**항상 최신의 데이터 버전을 보여줌**
Bounded-staleness (제한된 부실)	**항목의 최대 버전의 수 혹은 읽기가 쓰기보다 뒤처질 수 있는 시간 간격을 설정함**
Session (세션)	**클라이언트 세션 레벨에서 일관성을 보장함**
Consistent Prefix (일관된 접두사)	**쓰기가 이루어진 순서에 대해 일관된 순서로 볼 수 있도록 보장함**
Eventual (최종)	**일관성 보장이 없음**

Latency guaranty

	Reads (1KB)	Indexed writes (1KB)
P50	<2ms	<6ms
P99	<10ms	<15ms

읽기 10ms, 쓰기 15ms 이내 응답 보장

클라이언트의 네트워크 연결 최적화 필요

Client Optimizing

Gateway mode(Default) vs Direct mode (Performance optimized)

Cosmos DB와 동일한 지역에 클라이언트 배치

최신 SDK 설치

Cosmos DB vs Blob Costs

1KB 파일 기준	Cosmos DB	Blob
1백만 Read Operation	$ 0.022	$ 0.40
1백만 Write Operation	$ 0.111	$ 5

SLAs

Availability SLA

Throughput SLA

Consistency SLA

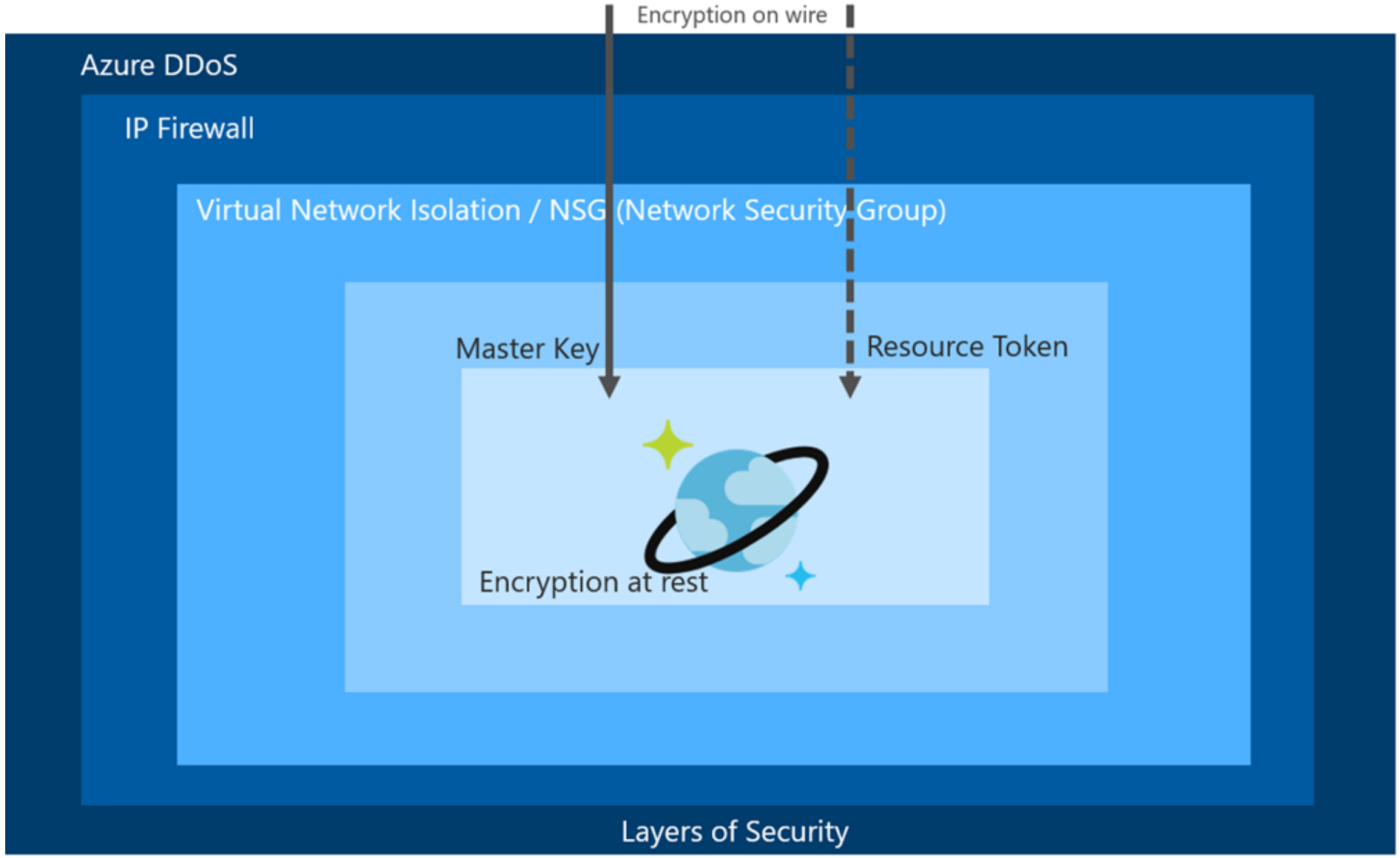
Latency SLA

10~25% Credit

Backup and Restore

- 자동화된 백업이 4시간마다 수행, 최근 2개의 백업 보관
- 백업은 성능 및 가용성에 영향이 없음
- 백업 작업은 RU를 소모하지 않음
- 자동화된 작업이므로 사용자의 관리가 필요하지 않음
- 복원은 Azure Support.

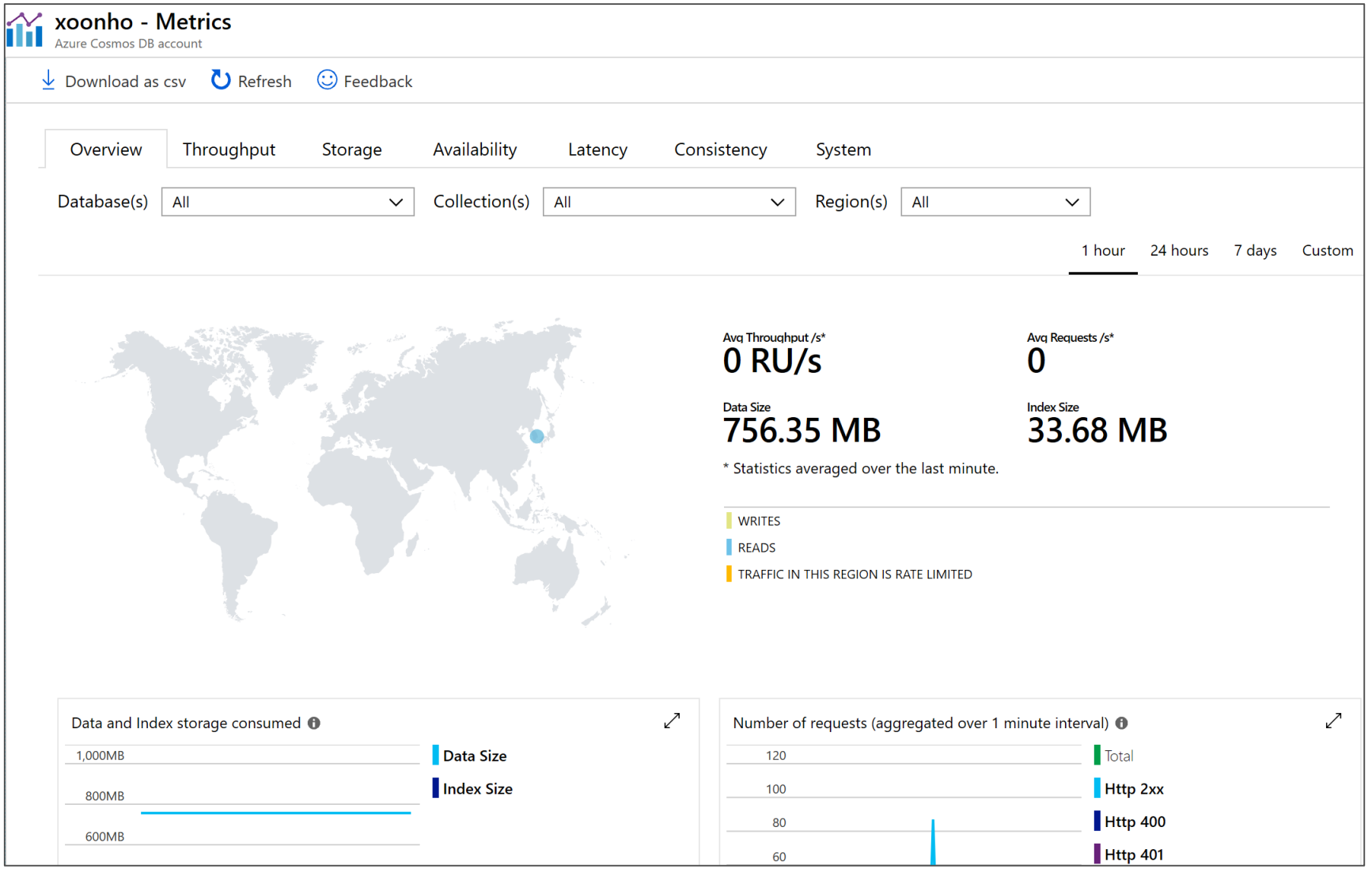
Security


Encryption on wire
Azure DDoS
IP Firewall
Virtual Network Isolation / NSG (Network Security Group)
Master Key
Resource Token
Encryption at rest
Layers of Security

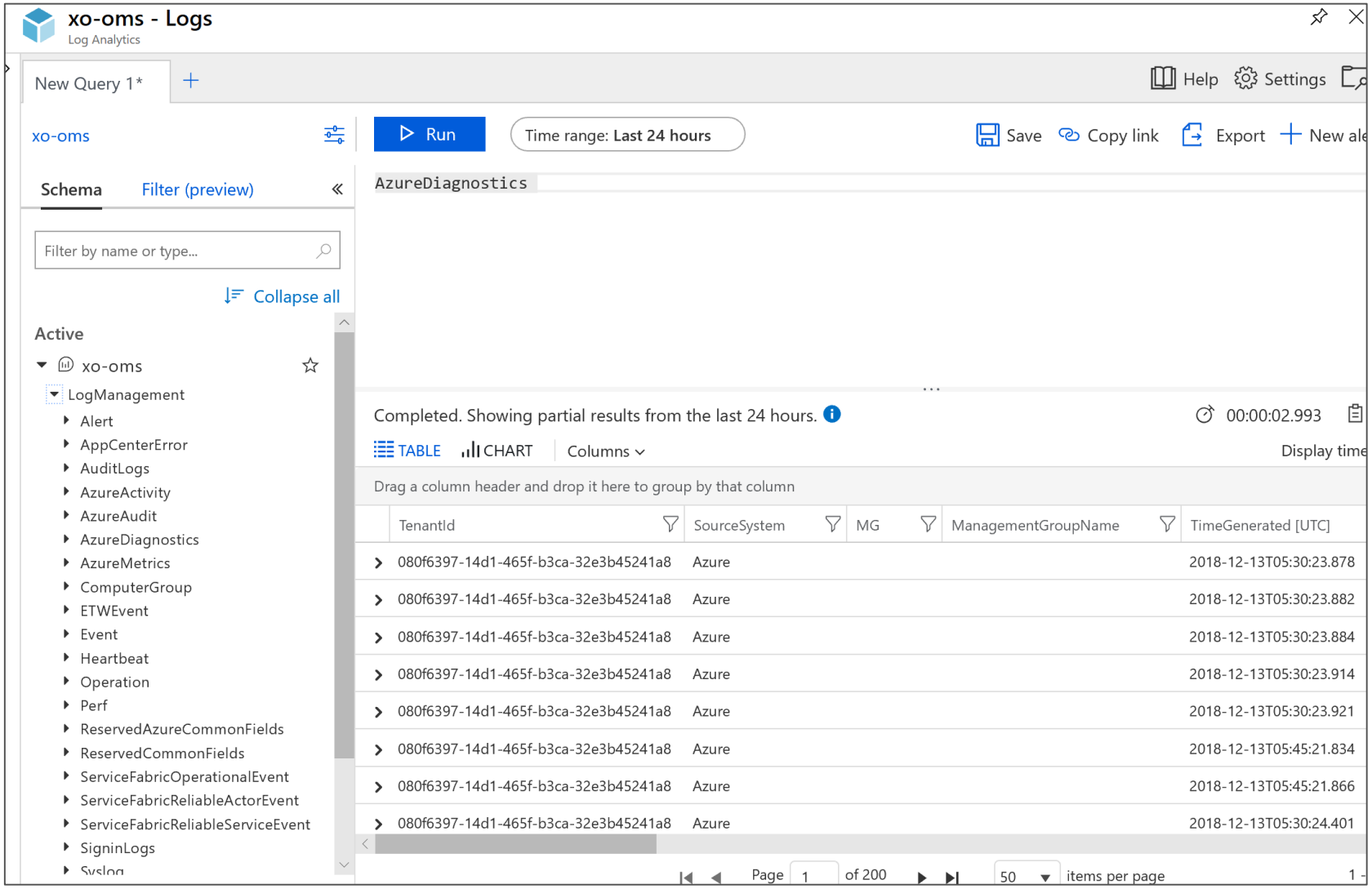
Monitoring

- 메트릭 모니터링
- 진단 로그
- 경고

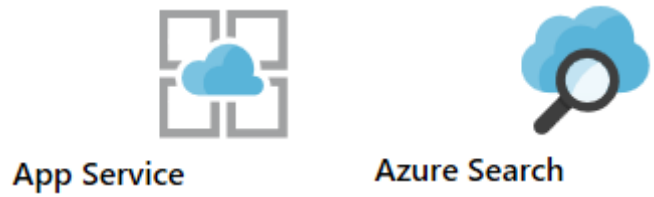
Monitoring

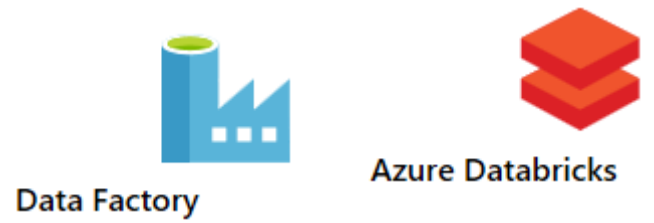

xoonho - Metrics
Azure Cosmos DB account
Download as csv
Refresh
Feedback
Overview
Throughput
Storage
Availability
Latency
Consistency
System
Database(s)
All
Collection(s)
All
Region(s)
All
1 hour
24 hours
7 days
Custom
Avg Throughput /s*
0 RU/s
Avg Requests /s*
0
Data Size
756.35 MB
Index Size
33.68 MB
* Statistics averaged over the last minute.
WRITES
READS
TRAFFIC IN THIS REGION IS RATE LIMITED
Data and Index storage consumed
1,000MB
800MB
600MB
Data Size
Index Size
Number of requests (aggregated over 1 minute interval)
120
100
80
60
Total
Http 2xx
Http 400
Http 401

Monitoring

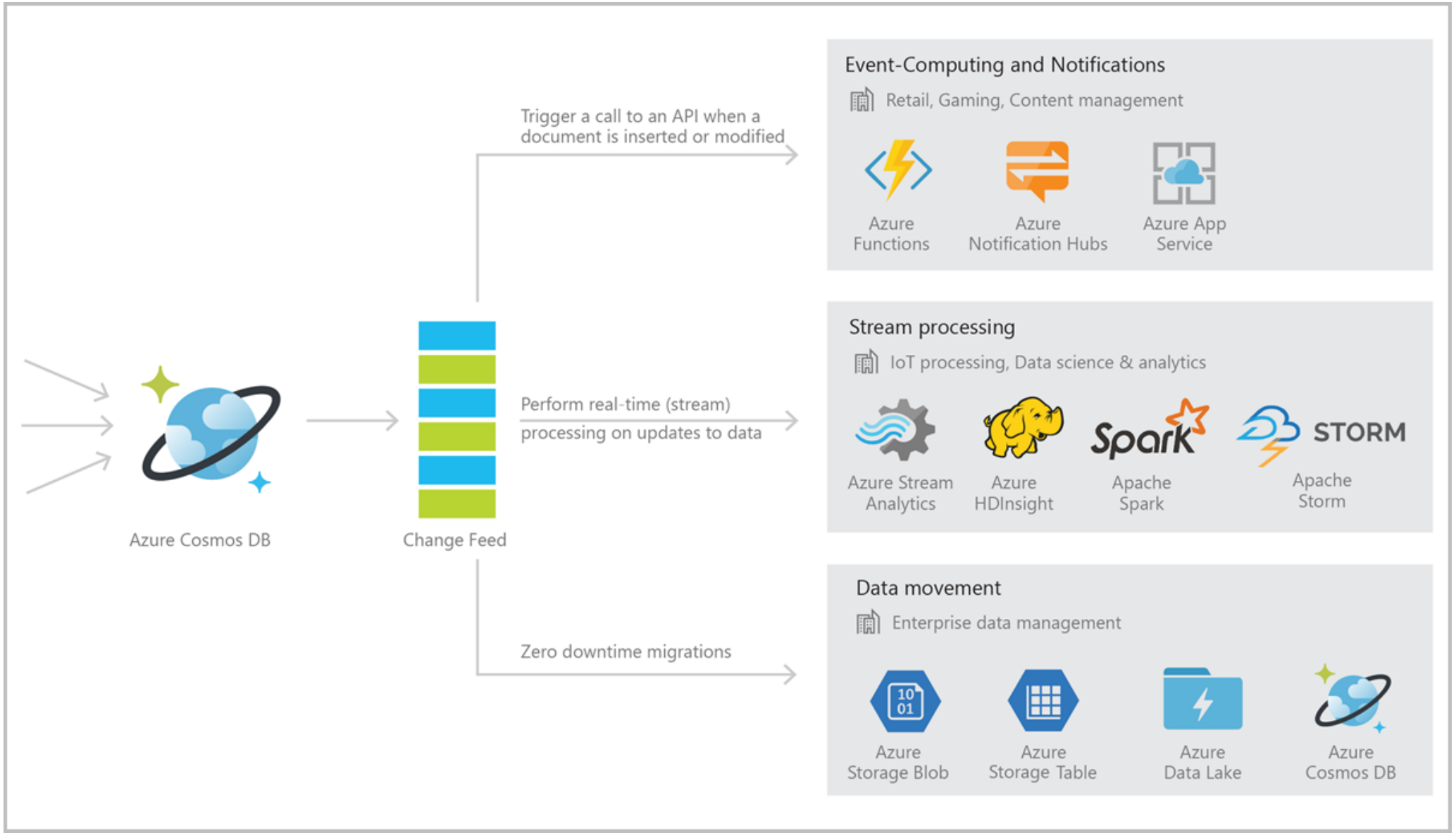

xo-oms - Logs
Log Analytics
New Query 1*
Help
Settings
xo-oms
Run
Time range: Last 24 hours
Save
Copy link
Export
New ale
Schema
Filter (preview)
AzureDiagnostics
Filter by name or type...
Collapse all
Active
xo-oms
LogManagement
Alert
AppCenterError
AuditLogs
AzureActivity
AzureAudit
AzureDiagnostics
AzureMetrics
ComputerGroup
ETWEvent
Event
Heartbeat
Operation
Perf
ReservedAzureCommonFields
ReservedCommonFields
ServiceFabricOperationalEvent
ServiceFabricReliableActorEvent
ServiceFabricReliableServiceEvent
SigninLogs
Syslog
Completed. Showing partial results from the last 24 hours.
00:00:02.993
TABLE
CHART
Columns
Display time
Drag a column header and drop it here to group by that column
TenantId
SourceSystem
MG
ManagementGroupName
TimeGenerated [UTC]
080f6397-14d1-465f-b3ca-32e3b45241a8 Azure 2018-12-13T05:30:23.878
080f6397-14d1-465f-b3ca-32e3b45241a8 Azure 2018-12-13T05:30:23.882
080f6397-14d1-465f-b3ca-32e3b45241a8 Azure 2018-12-13T05:30:23.884
080f6397-14d1-465f-b3ca-32e3b45241a8 Azure 2018-12-13T05:30:23.914
080f6397-14d1-465f-b3ca-32e3b45241a8 Azure 2018-12-13T05:30:23.921
080f6397-14d1-465f-b3ca-32e3b45241a8 Azure 2018-12-13T05:45:21.834
080f6397-14d1-465f-b3ca-32e3b45241a8 Azure 2018-12-13T05:45:21.866
080f6397-14d1-465f-b3ca-32e3b45241a8 Azure 2018-12-13T05:30:24.401
Page 1 of 200
50 items per page
1 -

Cosmos DB와 Azure의 다양한 서비스간의 연결





Cosmos DB Change Feed



Demo

- Azure Cosmos DB 포털 리뷰
- 퀵 스타트
- 성능테스트
- 모니터링
- Cosmos DB 데이터 시각화 with Power BI

Q&A